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that stream was a tributary of the Meuse and flowed through the valley now occupied by the beheaded bar.

This geological confirmation of the geographic interpretation of the river captures in this region made by Professor Davis* is interesting on account of the reversal in the order of the observations from those made in the case of the capture at Toul.† That the present upper Moselle formerly joined the Meuse was first argued from the presence of pebbles in the valley of the Meuse which must have come from that of the Moselle above Toul. The strong geographic argument from the form of the valleys later corroborated the geologic evidence. Now we have the geologic added to the geographic evidence for the turning of the Aire by the Aisne from the drainage system of the Meuse to that of the Seine.

One of the sources of the present Bar has been turned by man recently, so that it now increases the water supply of the Briquenay, the reversed portion of the subsequent Aire-Bar. This change of a water-course for industrial purposes is a continuation of the work begun by nature. The broad aggraded floodplain of the Bar is being taken advantage of this year, and a railway has been constructed along it between Sedan and Vouziers, with a branch running to Buzancy.

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CURRENT NOTES ON PHYSIOGRAPHY.

IS GREEN RIVER ANTECEDENT TO THE UINTA MOUNTAINS?

A RECENT paper by J. D. Irving ('Stratigraphical relations of the Brown's park beds of Utah,' *Trans. N. Y. Acad. Sci.*, XV., 1896, 253-259), says: "It is a fact no longer disputed that these deep cañons in the quartzite by which Green river

crosses the Uinta mountains were first established in the softer overlying formations, and that these formations furnished much of the corrosive material by means of which the harder rocks were cut away." It is not clear whether the overlying formations here mentioned were higher members of the Uinta arch or unconformably overlying Tertiaries. If the former, the writer would support Powell's explanation of the antecedent origin of the river; if the latter, he would support Emmons' view that the river is of superposed origin. In either case discussion on the question is hardly closed. Indeed, considering how frequently the Green is referred to as an antecedent river, it is remarkable that so little attention is given to the doubts that have been expressed regarding that manner of origin and to the difficulties that such an origin involves. Two recent text-books on geology credit the antecedent explanation. Tarr says: "In some cases the uplift of mountains appears to have been so slow that rivers have been able to maintain their courses across them as they rose; at least this is the interpretation placed upon some rivers, such as the Green river of Utah, which cuts directly across the high Uinta mountains' (*Elementary Geology*, 1897, 319). Scott is more cautious: "A famous example of what many authorities believe to be an antecedent stream is the Green river in Wyoming and Utah. Entering from the north, the river cuts its way in a winding course through the great mountain barrier of the Uintas in a remarkable series of cañons. This explanation is not accepted by all the observers who have examined the region; some of them explain the phenomenon by the theory of superimposed drainage" (*Introduction to Geology*, 1897, 325).

The Green river was unquestionably laked by the uplift of the Uinta range, and to this extent it is a defeated and not an

**Loc. cit.*, p. 232.

† *Loc. cit.*, p. 228.

antecedent river. Between its two meridional portions, north and south of the range, the river makes a great bend to the east, turning from the higher towards the lower part of the uplift—a remarkable coincidence, if this was an antecedent turn. It should further be noted that argument by which the antecedent origin of the Green was first supported, involved a similar origin for a number of smaller streams, although there can be little question that most or all of the latter are the result of headwater erosion along the strike of weak strata. Finally, the antecedent origin of the Green gives no adequate explanation to the broad depression of Brown's park near the eastern end of the mountains and chiefly within the rimming ridges. The paper by Irving, above named, explains the Brown's park beds as due to a lake formed by a slight uplift which dammed the river, but gives no consideration to the origin of the park itself. This, as well as the origin of the river, deserves careful study, in view of the frequent reference made to the region in geological writings. As the problem stands to-day, the Rhine in its gorge through the Schiefergebirge, in its middle course, is a better proved example of an antecedent river than the Green in its canyon through the Uinta mountains.

SANTA CATALINA ISLAND, CALA.

A STUDY of this interesting island has been made by W. S. T. Smith (*Geology of Santa Catalina Island*, Proc. Cal. Acad. Sci., I., 1897, 1-71), following a brief description of some of its physical features by Lawson three years ago. It is gratifying to see that Smith recognizes as a chapter of geology the processes of taking away as well as those of giving; the work of denudation as well as that of deposition. Both these processes are plainly involved in any discussion of geology as a matter of earth-history, although it has often enough been

the fashion to treat the 'geology' of a region as if it were concerned with composition, structure and deformation alone, giving only the briefest attention to denudation. Certainly, old mother earth has been about as much occupied with the latter as with the former, and our attention might be equally well distributed. Whether this chapter of geology shall be called geomorphogeny or geomorphy, or whether it affords appropriate material for these notes, is a less important matter.

Santa Catalina is regarded as a block broken from a much greater area of deformed basement rocks when the region was part of the mainland. Since then it has been dissected, partly covered with lavas, depressed so as to form an island, and the still emerged part denuded almost to a peneplain; then elevated, again dissected, and again depressed. The argument leading to this succession of events is well sustained. At present the shores are rapidly cut back by the sea. The gap in the island ridge where drowned valleys enter from either side, forming bays with with beautiful concave beaches, is explained as a local sag or structural depression.

NOTES.

FURTHER account of the Lammbach disaster on the north side of Lake Brienz, Switzerland (see *SCIENCE*, Jan. 1, 1897), is given by C. Schmidt, of Basel (*der Murgang des Lammbaches bei Brienz*, Schr., *Gesellsch. Urania*, Berlin, no. 43, 1896), with a number of excellent illustrations. Most peculiar is the abrupt termination of the stony flood at certain points, where its margin resembles that of a thin lava flow.

THE *Geology of the Fox Islands, Maine*, a dissertation by G. O. Smith, of Johns Hopkins University (1896), includes a brief account of their geography. The islands are hills rising over the broad floor of the

half-drowned Penobscot valley. Small modifications of form are ascribed to glacial action. The processes of to-day cut back the salients and fill the re-entrants of the shore line.

• 'GLACIAL flood deposits in the Chenango Valley,' described by A. P. Brigham (Bull. Geol. Soc. Amer., VIII., 1897, 17-30), are good examples of forms produced by the constrained drainage of the retreating glacier, passing from the Mohawk valley, over a divide and through the plateau country on the south, to the Susquehanna.

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CURRENT NOTES ON METEOROLOGY.

WINTER STORMS ON THE COAST OF CHINA.

Two noteworthy publications come to us from the Shanghai Meteorological Society. They are the 3d and 4th Annual Reports of that Society, and were prepared by Rev. S. Chevalier, the energetic President of the Society, and Director of the Zi-Ka-Wei Observatory, at Shanghai. The first is entitled an 'Essay on the Winter Storms of the Coast of China,' and the second, which is really a part of the same investigation, concerns 'The Variations of the Atmospheric Pressure over Siberia and Eastern Asia during the Months of January and February, 1890.' Both of these monographs furnish valuable information concerning the meteorology of the eastern coast of China. Among the results of Father Chevalier's study we note the following: The cyclones which travel across Europe and reach western Siberia experience great difficulty in crossing this region, and are generally driven off towards the North Pole by the anticyclone over Siberia, but some may cross the whole of Asia directly from west to east, or else may be deflected to the southeast towards China. These depressions over Siberia affect the weather on the coast of China indirectly. There are, in addition, cyclones

developed over China or further west, which cross the Chinese coast with an east or northeast movement, and it is such cyclones as these that precede the winter storms on the coast of China. The gale in these storms bursts more or less suddenly after the passage of the center, and depends for its violence on the depth of the depression, as well as on the height of the succeeding cyclone in the rear.

THE 'ILTIS' TYPHOON.

THE somewhat remarkable typhoon, which resulted in the loss of the German gunboat 'Iltis,' with all her officers and the majority of her crew, during the night of July 23-24, 1896, in the neighborhood of the Shantung Promontory, on the coast of China, has been made the subject of a special study by Rev. Louis Froc, S. J. The results are published by the Zi-Ka-Wei Observatory in a monograph entitled 'The Iltis Typhoon, July 22-25, 1896.' The conclusions reached by the author are interesting. He says: "There is never any advantage in undertaking a struggle with a typhoon. Even with the powerful forces which our great steel liners carry within their breast, prudence is yet in this instance a good adviser, and a safe anchorage is far better than the risks of a wrestle; no time is gained thereby, and the vessel is exposed, if not to a fatal loss, at least to serious damages. Several steamers (in this typhoon) were kept back, despite the force of their engines, in the neighborhood, or even drawn in towards the center of the hurricane." The swell from this typhoon was noted 500 miles in front of the advancing center. There was a marked fall of the barometer 310 miles from the center, and the lowest pressure recorded was 27.97 inches.

ANGOT'S 'THE AURORA BOREALIS.'

AN English translation of Angot's 'Les Aurores Polaires' appears as Vol. LXXVII.